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REMARKS/ARGUMENTS

Amendments were made to the specification to correct errors and to clarify the specification. No new matter has been added by any of the amendments to the specification. Claims 1-21 are pending in the present application. By this response, claims 1-4, 6, 8-18, and 20 are amended. The claims have been amended to clarify the subject that is being claimed. Support for these amendments may be found at least on page 19, lines 19-21, page 15, lines 4-6, and page 21, lines 14-18. Reconsideration of the claims in view of the above amendments and the following remarks is respectfully requested.

I. Examiner Interview

Applicants thank Examiner Lai and Examiner Fleming for the courtesies extended to Applicants' representative during the July 12, 2006 telephone interview. During the interview, the objection to the drawings was discussed. Applicants' representative indicated that specification contained a incorrect numbering of element 260 and that an amendment to the specification is made to correct the issue. Also, during the interview, suggestions to amend the present application to overcome the 35 U.S.C. § 101 rejections were discussed. Claims 1, 8, and 15 are to recite "prefetching the plurality of branch instructions using the plurality of branch predictions." Claim 15 is further amended to recite "A computer program product in a recordable-type computer readable medium..." The Examiners stated these amendments would overcome the 35 U.S.C. § 101 rejection. Also during the interview, proposed amendments to claims 1, 8, and 15 were discussed. Examiner Lai stated he would consider the proposed amendment.

II. Drawings

The Office objects to the Drawings as including reference character(s) not mentioned in the description, specifically, element 260 of Figure 2. Applicants have amended the specification to clarify an incorrect numbering of elements. In view of the above, Applicants respectfully request the objection to the Drawings be withdrawn.

III. 35 U.S.C. § 112, second paragraph

The Office rejects claim 8-14 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter, which Applicants regard as the invention. By this response, claim 8 is amended to recite "A branch prediction apparatus."

The Office rejects claim 16-18 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter, which Applicants regard as the invention. Applicants respectfully submit that a branch statistic field is a field of data within a storage area. In the specification, Applicants recite:

In this illustrative example implementation, there are three branch statistic fields associated with each branch statistic: branch field 402, branch prediction field 404, and branch count field 406. These branch statistics fields are part of branch statistics, such as branch statistics 302-308, stored in a separate area of storage, such as performance instrumentation shadow cache 310 as described in Figure 3.

(Specification, page 24, lines 2-9)

Thus, Applicants clearly provide support for the term branch statistic field as being part of branch statistics which is data stored in a storage. Therefore, Applicants request withdrawal of the rejection of claims 8-14 and 16-18 under 35 U.S.C. § 112, second paragraph.

IV. 35 U.S.C. § 101

The Office rejects claims 1-7 and 15-21 under 35 U.S.C. § 101 as being directed towards non-statutory subject matter. By this response, claims 1, 8, and 15 are amended to recite "predicting branches to be taken using the branch statistics to form branch predictions; and prefetching the plurality of branch instructions using the branch predictions." Applicants respectfully submit that prefetching the plurality of branch instructions using the branch predictions has a practical application and is in the technical arts. As to claims 7 and 21, the Office states that it interprets the claims as a counting action. Applicants respectfully submit that the claims recited how and when counting is performed by reciting "wherein branches per instruction are counted during execution of the computer program." Thus, in addition to being dependent on claims 1 and 15, claims 7 and 21 are statutory by limiting the subject matter of claim 1 to when the counting is performed. Since claims 2-7 and 16-21 depend from claims 1 and 15, Applicants respectfully submit these claims also have practical application and are in the technical arts. Therefore, Applicants submit that claims 1-7 and 15-21 are statutory and Applicants respectfully request the withdrawal of the rejection of claims 1-7 and 15-21 under 35 U.S.C. § 101.

The Office rejects claims 15-21 under 35 U.S.C. § 101 as being directed towards non-statutory subject matter. By this response, claim 15 is amended to recite "A computer program product in a recordable-type computer readable medium..." Therefore, Applicants respectfully submit that independent claim 15 is statutory. Thus, Applicants respectfully request withdrawal of the rejection of claims 15-21 under 35 U.S.C. § 101.

V. 35 U.S.C. § 102. Alleged Anticipation

The Office rejects claims 1-21 under 35 U.S.C. § 102(b) as being anticipated by Holmberg (U.S. Patent No. 6,233,679 B1). This rejection is respectfully traversed.

As to claim 1, the Office states:

As per claim 1, Holmberg discloses a method of performing branch prediction (See column 3, lines 35-37: Branch prediction is the main purpose of the Holmberg invention) in a computer program, comprising the steps of:
associating one or more hardware counters with one or more branch instructions (See column 4, lines 56-63: Multiple counters are used—each for counting various actions);
using the one or more hardware counters, autonomically counting branch instructions that are executed to generate branch statistics (See column 4, lines 64-65: Counters are used from providing statistics);
predicting branches to be taken using the branch statistics (See column 4, lines 64-65: Counter statistics are used to set branch prediction bits).

Office Action dated April 19, 2006, page 5.

A prior art reference anticipates the claimed invention under 35 U.S.C. § 102 only if every element of a claimed invention is identically shown in that single reference, arranged as they are in the claims. *In re Bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d 1566, 1567 (Fed Cir. 1990). All limitations of the claimed invention must be considered when determining patentability. *In re Lowry*, 32 F.3d 1579, 1582, 32 U.S.P.Q.2d 1031, 1034 (Fed Cir. 1994). Anticipation focuses on whether a claim reads on the product or process a prior art reference discloses, not on what the reference broadly teaches. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 U.S.P.Q. 781 (Fed. Cir. 1983). Applicants respectfully submit that Holmberg does not teach every element of the claimed invention arranged as they are in the claims.

Amended claim 1, which is representative of the other rejected independent claims 8 and 15 with respect to similarly recited subject matter, reads as follows:

1. A method of performing branch prediction in a computer program, comprising the steps of:
identifying a plurality of branch instructions for application code being compiled;
associating a plurality of hardware counters with the plurality of branch instructions;

using the plurality of hardware counters to autonomically count all of the plurality of branch instructions that are executed in parallel to generate a plurality of branch statistics;
predicting branches to be taken using the plurality of branch statistics to form branch predictions; and
prefetching the plurality of branch instructions using the plurality of branch predictions. (emphasis added)

Applicants respectfully submit that Holmberg does not teach every feature in amended claim 1 in the same arrangement as recited in claim 1. More specifically, Holmberg does not teach using the plurality of hardware counters to autonomically count all of the plurality of branch instructions that are executed in parallel to generate branch statistics.

Holmberg is directed to a branch prediction system that uses a scanning mechanism for scanning the program memory for conditional branch instructions during the running of the program. When finding such an instruction the system records during a preset time interval the statistics for that specific conditional branch instruction and sets a branch prediction bit in the instruction accordingly. The system then starts to scan for the next conditional branch instruction in the program memory. (see Holmberg, Abstract)

Thus, Holmberg only records statistics for one specific conditional branch instruction at a time. In contradistinction, the present invention associates a plurality of hardware counters with a plurality of branch instructions and uses the plurality of hardware counters to autonomically count all of the plurality of branch instructions that are executed in parallel to generate branch statistics. As a result, all of the branch instructions are counted as they are executed as opposed to Holmberg who states:

Thus, the background program begins with scanning or searching the program memory for the first conditional jump instruction in a block 303. When finding the first conditional branch instruction the corresponding program memory address is loaded into the Measured Address Register (MAR) in a block 305. Thereupon the program checks all counters used for collecting the statistics in a block 307.

Next, all counters are started in a block 309. The background program now waits for statistics to be collected. The counters are incremented each time the program from which statistics are collected executes the conditional branch instruction associated with the address stored in the MAR and when the corresponding branch is taken, respectively, if the implementation as described in conjunction with FIG. 2 is used. The statistics for a specific conditional branch instruction are collected for a predefined time as indicated in block 311, which can be equally long for each conditional branch instruction.

(Holmberg, column 5, lines 16-25)

In this section, Holmberg specifically describes the system scans for the first conditional jump instruction. Once the first conditional jump instruction is encountered, it is loaded into a measured address register. Then, Holmberg increments counter each time the program from which statistics are collected executes the conditional branch instruction associated with the address stored in the MAR and when the

corresponding branch is taken. Thus, Holmberg only records statistics for one conditional jump instruction and then moved onto the next conditional branch instruction. The present invention counts all of the plurality of branch instructions that are executed in parallel to generate branch statistics.

Thus, Holmberg does not teach each and every feature of independent claims 1, 8, and 15 as is required under 35 U.S.C. § 102. At least by virtue of their dependency on independent claims 1, 8 and 15, the specific features of dependent claims 2-7, 9-14, and 16-21 are not taught by Holmberg. Accordingly, Applicants respectfully request withdrawal of the rejection of claims 1-21 under 35 U.S.C. § 102.

Furthermore, Holmberg does not teach, suggest or give any incentive to make the needed changes to reach the presently claimed invention. Absent the Office pointing out some teaching or incentive to implement Holmberg such that associates a plurality of hardware counters with a plurality of branch instructions and uses the plurality of hardware counters to autonomically count all of the plurality of branch instructions that are executed in parallel to generate branch statistics, one of ordinary skill in the art would not be led to modify Holmberg to reach the present invention when the reference is examined as a whole. Absent some teaching, suggestion or incentive to modify Holmberg in this manner, the presently claimed invention can be reached only through an improper use of hindsight using the Applicants' disclosure as a template to make the necessary changes to reach the claimed invention.

VI. Conclusion

It is respectfully urged that the subject application is patentable over the prior art of record and is now in condition for allowance. The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

Respectfully submitted,

DATE:

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